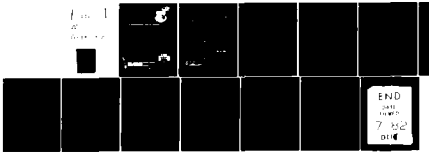
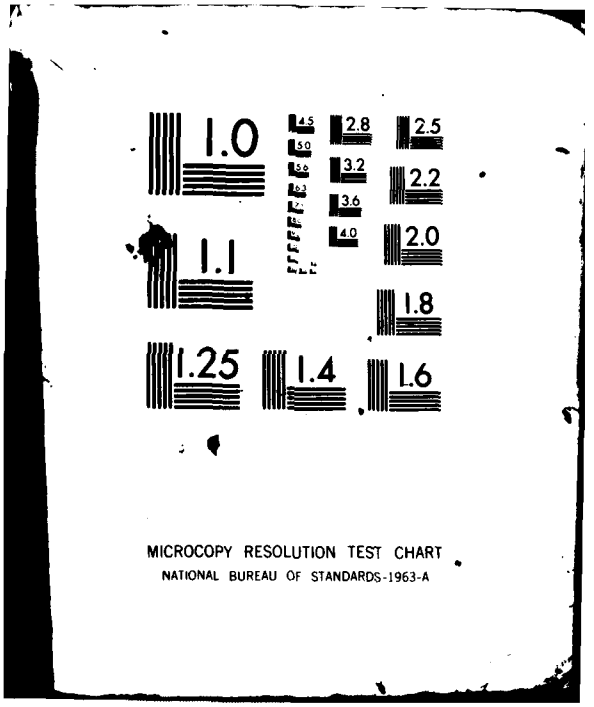
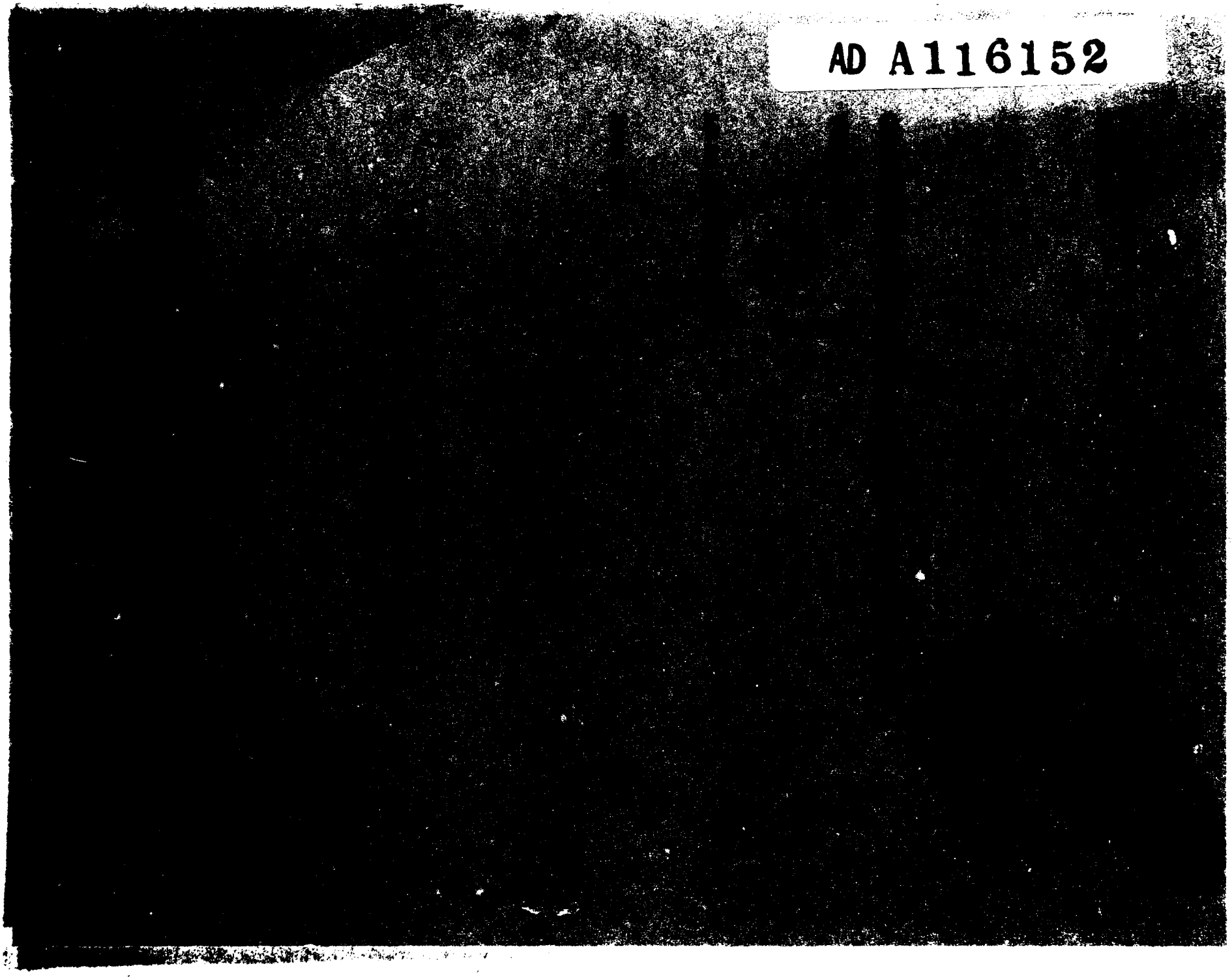
AD-A116 152 AIR FORCE AEROSPACE MEDICAL RESEARCH LAB WRIGHT-PATT--ETC F/G 1/2
USAF BIOENVIRONMENTAL NOISE DATA HANDBOOK. VOLUME 167. MA-3M AI--ETC(U)
JUN 82 T H RAU
UNCLASSIFIED AMRL-TR-75-50-VOL-167 NL




1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
4.5
5.0
5.6
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A



SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER AMRL-TR-75-50, Vol. 167	2. GOVT ACCESSION NO. AD-A116 157	3. RECIPIENT'S CATALOG NUMBER
4. TITLE *(and Subtitle)* USAF BIOENVIRONMENTAL NOISE DATA HANDBOOK: MA-3M Air Conditioner		5. TYPE OF REPORT & PERIOD COVERED Volume 167 of a series 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Thomas H. Rau, 1/Lt, USAF, BSC		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Air Force Aerospace Medical Research Laboratory Aerospace Medical Division, Air Force Systems Command, Wright-Patterson AFB, OH 45433		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 62202F 72310714
11. CONTROLLING OFFICE NAME AND ADDRESS Same as above		12. REPORT DATE June 1982 13. NUMBER OF PAGES 18
14. MONITORING AGENCY NAME & ADDRESS*(if different from Controlling Office)*		15. SECURITY CLASS. *(of this report)* Unclassified 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT *(of this Report)*

Approved for public release; distribution unlimited

17. DISTRIBUTION STATEMENT *(of the abstract entered in Block 20, if different from Report)*

18. SUPPLEMENTARY NOTES

19. KEY WORDS *(Continue on reverse side if necessary and identify by block number)*

Noise
Noise Environments
Bioenvironmental Noise
Ground Support Equipment
MA-3M Air Conditioner

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

The MA-3M is an electric motor-driven air conditoner designed to cool electronic equipment on aircraft during ground maintenance. This report provides measured and extrapolated data defining the bioacoustic environments produced by this unit operating at a normal rated condition. Near-field data are reported for 37 locations in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

sound levels, preferred speech interference levels, perceived noise levels, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Refer to Volume 1 of this handbook, "USAF Bioenvironmental Noise Data Handbook, Vol 1: Organization, Content and Application," AMRL-TR-75-50(1) 1975, for discussion of the objective and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc.

PREFACE

This report was prepared by the Biodynamic Environment Branch, Air Force Aerospace Medical Research Laboratory, under Project/Task 723107, Measurement and Prediction of Noise Environments of Air Force Operations.

The author gratefully acknowledges Mr. John N. Cole for his assistance in preparing this report, Mr. Robert G. Powell for his assistance in acquiring the raw data, Mr. Henry T. Mohlman and Mr. Fred D. Lampley of the University of Dayton for their assistance in the mechanics of data processing and Mrs. Norma J. Peachey who typed and prepared the graphics.

Table of Contents

List of Tables

List of Figures

INTRODUCTION

The MA-3M is an electric motor-driven air conditioner designed to cool electronic equipment on aircraft during ground maintenance. This unit was manufactured by Keco Industries Inc.

This volume provides measured and extrapolated data defining bioacoustic environments produced by this unit. Such data are essential to evaluate ear protection requirements, limiting personnel exposure times, voice communication capabilities, and annoyance problems associated with operations of the MA-3M air conditioner.

This volume is one of a series published by the Air Force Aerospace Medical Research Laboratory (AFAMRL) under the same report number (AMRL-TR-75-50) as a multi-volume handbook that quantifies the noise environments produced at flight/ground crew locations and in surrounding communities by operations of Air Force aircraft and ground support equipment. The far-field, community-type, noise data in the handbook describe the noise produced during ground operations of aircraft, ground support equipment, and other ground-based equipment or facilities.

Volume 1 of this handbook discusses the objectives and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc. Refer to Volume 1 (reference 1) for such information because it is not repeated in other handbook volumes.

A cumulative index lists those aerospace systems contained in the handbook, and identifies the specific volumes containing each type of environmental noise data available (i.e., inflight/flight crew and passenger noise, near-field ground crew noise, far-field/community noise). Volume numbers are assigned sequentially as individual volumes are published. This index is periodically updated as individual volumes are published and is available upon request from AFAMRL/BBE, Wright-Patterson AFB, OH 45433. Organizations on the distribution list for the handbook will automatically receive a copy of each updated index as it is generated.

Direct any questions concerning the technical data in this report and other handbook volumes to: AFAMRL/BBE, Wright-Patterson AFB, OH 45433; AUTOVON 78-53675 or 78-53664; Commercial (513) 255-3675 or (513) 255-3664.

---

1. *Cole, John N., USAF Bioenvironmental Noise Data Handbook, Volume 1: Organization, Content and Application, AMRL-TR-75-50(1), Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio, 1975.*

NEAR-FIELD NOISE

MEASUREMENT

A standard MA-3M was operated outside, in front of radar docks used for aircraft maintenance, on a concrete slab, at a normal rated condition. Due to the proximaty of the radar docks no far-field data were acquired.

Figure 1 identifies 36 noise measurement locations at a height of 1.5 meters above the concrete apron (nominal ear level of ground crew). The 0 degree reference direction passes through the tow bar. The locations are in the acoustic near-field of the source where the sound wave fronts generally do not spherically diverge and the source appears to be spatially distributed (i.e., not a point source). Consequently, these near-field data cannot be extrapolated to longer distances but do properly define the levels at locations close to the unit.

Near-field measurements were also made at ear level at the operator control panel. Table 1 lists the numeric/alphabetic designators used on the data pages in this report to identify the operator measurement location and test conditions. The designator 1/A means operator location 1 and test condition A. Such a descriptor is essential in many handbook volumes that involve multiple combinations of location/conditions. It is used in this report to maintain format consistency.

RESULTS

The measured data presented in Table 2 define the sound pressure levels (SPL) produced by the MA-3M unit at the 37 specified, near-field locations. This table includes the overall, 1/3 octave band, and octave band levels. From these data one can calculate the variety of measures in Table 3 which are widely used to assess the effects of noise on personnel and their performance.

For data at other intermediate near-field locations (i.e., for radial distances less than 4 meters) you can interpolate between the 36 measured data points.

TABLE 1

MEASUREMENT LOCATIONS AND TEST CONDITIONS
FOR OPERATOR NOISE MEASUREMENTS

MA-3M Air Conditioner
Tyndall AFB, 19 June 1980
4120-58-DFD-7440, Field # F-42

Measurement Location		
	1	Operator Control Panel
Operation		
	A	Cooling Cycle

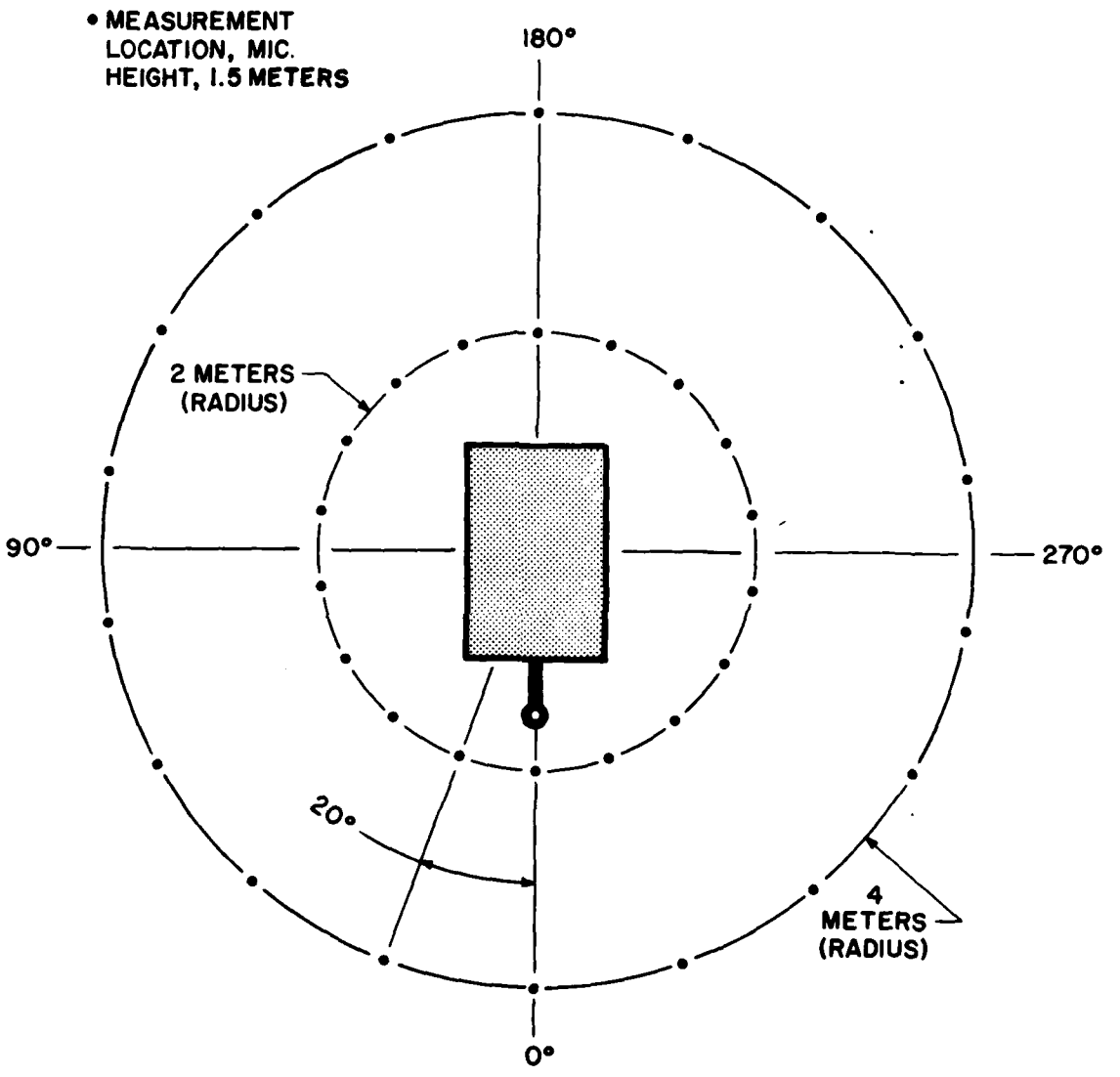


Figure 1. Measurement Locations

TABLE: 2 — MEASURED SOUND PRESSURE LEVEL (DB) 1/3 OCTAVE BAND

NOISE SOURCE/SUBJECT: MA-3M AIR CONDITIONER; GROUND CREW; NEAR FIELD NOISE LEVELS

OPERATION: COOLING CYCLE

IDENTIFICATION: OMEGA 3.2; TEST BA-000-004; RUN 01; 06 APR 82; PAGE F1

	LOCATION/CONDITION												
DISTANCE (M)->	4	4	4	4	4	4	4	4	4	4	4	4	4
FREQ ANGLE (DEG)-->	0	20	40	60	80	100	120	140	160	180	200	220	240
(HZ) CONDITION---->	A	A	A	A	A	A	A	A	A	A	A	A	A
25													
31.5													
40													
50		74<	76<	75<	74<						78<	79<	76<
63	83<	85	89	88	87	85	86	85	82<	83<	90	91	88
80	73<												
100	73<	76<	75<				73<	76<	74<	76<	74<	78<	74<
125	81<	85	85	75<	78<	75<	83	86	81<	84	81<	88	82
160	81	80	75<	77<	79	80	77<	79	81	82	83	83	81
200	81	82	76	81	81	81	81	83	86	87	84	83	80
250	81	81	78	81	80	77	76	77	85	84	84	86	86
315	88	91	93	97	92	83	86	95	94	94	100	103	106
400	89	93	94	99	93	83	87	96	95	95	101	104	107
500	78	80	79	81	77	77	77	79	80	81	82	84	84
630	84	83	85	80	83	80	81	83	83	85	86	93	91
800	84	84	85	79	84	79	80	82	81	84	85	93	91
1000	79	79	79	77	75	76	76	78	79	78	82	84	85
1250	79	77	77	77	75	76	76	76	78	76	78	79	79
1600	76	74	74	73	72	73	73	75	76	74	75	78	76
2000	72	71	71	70	69	69	70	73	73	71	74	75	75
2500	75	74	74	72	71	72	72	74	75	73	75	77	78
3150	74	73	73	72	71	71	72	73	73	72	74	74	74
4000	71	70	70	69	68	67	69	70	70	68	70	71	72
5000	72	69	69	67	65	66	66	68	68	67	68	69	69
6300	68	66	67	65	65	64	64	64	65	63	64	65	66
8000	65	65	65	63	62	63	63	63	64	62	63	64	65
10000	61	60	61	59	59	59	60	60	60	59	60	61	62
OVERALL	95	97	98	101	97	91	93	99	99	99	104	107	109

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: 2 MEASURED SOUND PRESSURE LEVEL (DB)
1/3 OCTAVE BAND

NOISE SOURCE/SUBJECT:
MA-3M AIR CONDITIONER
GROUND CREW
NEAR FIELD NOISE LEVELS

OPERATION:
COOLING CYCLE

IDENTIFICATION:
OMEGA 3.2
TEST BA-000-004
RUN 02
06 APR 82
PAGE F2

	LOCATION/CONDITION												
DISTANCE (M) ->	4	4	4	4	4	2	2	2	2	2	2	2	2
FREQ ANGLE (DEG) -->	260	280	300	320	340	0	20	40	60	80	100	120	140
(HZ) CONDITION---->	A	A	A	A	A	A	A	A	A	A	A	A	A
25						81<		89<					
31.5						81<		80<	78<	78<	77<	78<	
40						81<	77<	84<	78<	78<		77<	
50		76<	79<	81<	83<	82<	83<	84<	82<	81<	81<	80<	79<
63	85	88	91	94	95	94	95	92	92	93	91	89	88
80			74<	74<	79<	79<	78<	78<	77<	80<	78<	77<	75<
100	77<	76<	73<	75<	78<	82<	85	78<	80<	80<	79<	81<	86
125	87	85	74<	81<	81<	90	95	84	87	86	84	90	96
160	79	78<	83	80	83	89	87	87	88	88	89	87	89
200	84	80	83	81	84	89	85	86	88	86	90	89	92
250	89	88	83	83	85	87	87	86	96	89	89	88	90
315	106	103	103	104	107	97	90	90	101	96	96	100	99
400	107	104	104	105	109	98	88	89	102	97	97	101	100
500	83	82	84	82	85	87	89	89	86	90	96	88	89
630	93	87	90	92	99	95	95	92	90	87	86	88	89
800	93	87	90	91	99	95	95	91	91	88	88	89	90
1000	83	87	80	83	86	87	89	85	84	84	86	84	85
1250	79	80	79	79	82	85	86	85	84	83	84	83	84
1600	78	77	77	75	80	83	82	83	82	81	81	81	83
2000	75	74	75	74	76	79	78	78	79	78	78	78	79
2500	80	77	79	75	80	81	80	80	80	80	80	80	80
3150	76	75	76	75	79	81	81	80	80	80	79	79	80
4000	73	72	73	73	75	78	78	77	77	76	75	76	77
5000	71	69	70	71	73	77	77	76	76	75	75	75	76
6300	66	66	67	68	70	72	72	74	74	74	73	73	73
8000	65	65	66	66	68	70	70	74	73	72	72	72	73
10000	63	61	63	63	65	67	66	68	69	70	68	69	68
OVERALL	110	107	107	108	112	104	103	100	106	102	102	104	105

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: 2 MEASURED SOUND PRESSURE LEVEL (DB)
1/3 OCTAVE BAND

IDENTIFICATION:
OMEGA 3.2
TEST BA-000-004
RUN 03
06 APR 82
PAGE F3

NOISE SOURCE/SUBJECT:
MA-3M AIR CONDITIONER
GROUND CREW
NEAR FIELD NOISE LEVELS

OPERATION:
COOLING CYCLE

LOCATION/CONDITION

FREQ (HZ)	DISTANCE (M)-> / ANGLE (DEG)--> / CONDITION---->	2 160 A	2 180 A	2 200 A	2 220 A	2 240 A	2 260 A	2 280 A	2 300 A	2 320 A	2 340 A	OPERATOR LOCATION TEST CONDITION 1/A
25		83<	84<					97	92		81<	
31.5		80<	82<	81<	78<			94	89	78<	80<	
40		82<	82<	80<				90	87<	78<	80<	77<
50		82<	83<	83<	83<	83<	84<	87	86	79<	82<	83<
63		88	90	91	95	95	95	93	89	85	91	95
80		81<	81<	81<	78<	79<	78<	81<	82<	78<	79<	81<
100		85	85	87	83	80<	80<	81<	80<	80<	79<	83
125		95	88	94	92	87	88	87	83	84	83	92
160		95	94	94	92	88	91	91	93	92	89	91
200		101	94	94	90	91	94	92	94	92	87	92
250		93	94	92	89	95	96	92	94	91	89	96
315		95	104	100	104	112	113	115	115	108	102	107
400		97	106	100	106	114	115	116	116	109	104	109
500		93	95	94	92	91	93	94	95	91	87	90
630		96	96	94	98	99	103	102	101	101	92	98
800		95	95	91	98	99	103	102	102	102	93	99
1000		91	91	90	91	95	94	87	92	89	87	95
1250		90	90	89	86	87	87	88	88	87	84	87
1600		83	89	86	83	83	82	88	87	87	81	83
2000		88	85	84	81	82	83	84	81	80	77	81
2500		87	85	84	82	84	87	86	85	83	80	80
3150		87	86	85	80	81	82	85	83	81	79	79
4000		85	83	82	77	78	80	82	81	80	81	76
5000		82	80	80	75	76	78	78	79	77	79	75
6300		75	74	74	71	72	73	74	75	73	74	72
8000		75	75	73	70	72	73	72	74	72	72	72
10000		72	71	69	67	69	71	71	71	68	68	70
OVERALL		107	109	106	109	116	117	119	119	112	107	112

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: 2 MEASURED SOUND PRESSURE LEVEL (DB) OCTAVE BAND

NOISE SOURCE/SUBJECT:
MA-3M AIR CONDITIONER
GROUND CREW
NEAR FIELD NOISE LEVELS

OPERATION:
COOLING CYCLE

IDENTIFICATION:
OMEGA 3.2
TEST BA-000-004
RUN 01
06 APR 82
PAGE J1

FREQ (HZ)	DISTANCE (M)-> / ANGLE (DEG)--> / CONDITION---->	LOCATION/CONDITION 4 0 A	4 20 A	4 40 A	4 60 A	4 80 A	4 100 A	4 120 A	4 140 A	4 160 A	4 180 A	4 200 A	4 220 A	4 240 A
31.5														
63		83	85	89	88	87						90	91	88
125		84	86	86	79	81	81	84	87	95	86	86	90	85
250		89	92	93	97	92	85	87	95	95	95	100	103	106
500		90	93	95	99	94	85	88	96	95	96	101	104	107
1000		85	86	87	83	85	82	83	84	84	86	87	94	92
2000		79	78	79	77	75	76	77	79	79	78	79	82	81
4000		77	75	76	74	74	73	74	75	75	74	76	76	77
8000		70	69	70	68	67	67	67	67	68	66	67	68	69
OVERALL		95	97	98	101	97	90	93	99	99	99	104	107	109

TABLE: 2 MEASURED SOUND PRESSURE LEVEL (DB) OCTAVE BAND

IDENTIFICATION:
OMEGA 3.2
TEST 8A-000-004
RUN 02
06 APR 82
PAGE J2

NOISE SOURCE/SUBJECT:
MA-3M AIR CONDITIONER
GROUND CREW
NEAR FIELD NOISE LEVELS

OPERATION:
COOLING CYCLE

		LOCATION/CONDITION												
	DISTANCE (M) ->	4	4	4	4	4	2	2	2	2	2	2	2	2
FREQ	ANGLE (DEG) -->	260	280	300	320	340	0	20	40	60	80	100	120	140
(HZ)	CONDITION---->	A	A	A	A	A	A	A	A	A	A	A	A	A
31.5							86		91	81	81		88	
63			88	92	94	95	94	95	92	93	93	92	90	89
125		85	86	84	84	86	93	96	89	91	90	90	92	97
250		106	103	103	104	107	98	93	92	102	97	98	100	100
500		107	104	104	105	109	99	96	95	102	98	97	101	101
1000		93	98	91	92	99	96	96	92	93	98	91	91	92
2000		83	81	82	79	83	86	85	85	85	84	84	84	86
4000		78	77	78	76	81	84	83	83	83	83	81	82	83
8000		70	69	70	71	73	75	75	77	77	77	76	76	76
OVERALL		110	107	107	108	112	104	103	100	106	102	102	104	105

TABLE: 2 MEASURED SOUND PRESSURE LEVEL (DB)
OCTAVE BAND

IDENTIFICATION:
OMEGA 3.2
TEST BA-000-004
RUN 03
06 APR 82
PAGE 33

NOISE SOURCE/SUBJECT:
MA-TM AIR CONDITIONER
GROUND CREW
NEAR FIELD NOISE LEVELS

OPERATION:
COOLING CYCLE

	LOCATION/CONDITION										
DISTANCE (M)->	2	2	2	2	2	2	2	2	2	2	OPERATOR LOCATION
FREQ ANGLE (DEG)-->	160	180	200	220	240	260	280	330	320	340	TEST CONDITION
(HZ) CONDITION---->	A	A	A	A	A	A	A	A	A	A	1/A
31.5	87	88	83				99	95	81	85	
53	88	91	92	95	95	95	94	91	86	92	95
125	98	95	97	95	91	93	93	94	93	90	95
250	102	105	101	104	112	113	115	115	108	102	108
500	100	107	102	106	114	115	116	116	110	104	109
1000	97	97	95	99	101	104	102	102	102	94	100
2000	93	91	90	87	88	89	91	90	89	84	86
4000	90	88	87	83	84	85	87	86	84	84	82
8000	80	78	77	74	76	77	77	78	76	77	76
OVERALL	107	109	106	109	116	117	119	119	112	107	112

TABLE: 3 MEASURES OF HUMAN NOISE EXPOSURE

IDENTIFICATION:
OMEGA 3.2
TEST BA-000-004
RUN 01
06 APR 82
PAGE H1

NOISE SOURCE/SUBJECT: MA-3M AIR CONDITIONER, GROUND CREW, NEAR FIELD NOISE LEVELS
OPERATION: COOLING CYCLE

LOCATION/CONDITION													
DISTANCE (M)->	4	4	4	4	4	4	4	4	4	4	4	4	4
ANGLE (DEG)--->	0	20	40	60	80	100	120	140	160	180	200	220	240
CONDITION---->	A	A	A	A	A	A	A	A	A	A	A	A	A
HAZARD/PROTECTION													
C-WEIGHTED OVERALL SOUND LEVEL (OASLC IN DBC) AT EAR													
A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DBA) AT EAR													
MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)													
NO PROTECTION													
OASLC	95	97	98	101	97	91	93	99	99	99	104	107	109
OASLA	91	92	93	96	92	86	88	94	93	94	98	102	104
T	143	120	101	60	120	339	240	85	101	85	42	21	15
MINIMUM QPL EAR MUFFS													
OASLA*	71	73	75	78	73	67	70	76	75	76	80	84	86
T	960	960	960	960	960	960	960	960	960	960	960	480	339
AMERICAN OPTICAL 1700 EAR MUFFS													
OASLA*	66	69	70	73	69	63	65	71	70	71	75	78	81
T	960	960	960	960	960	960	960	960	960	960	960	960	807
V-51R EAR PLUGS													
OASLA*	68	70	72	75	70	63	66	73	72	73	77	81	83
T	960	960	960	960	960	960	960	960	960	960	960	807	571
AMERICAN OPTICAL 1700 EAR MUFFS PLUS V-51R EAR PLUGS													
OASLA*	53	54	55	57	54	49	50	56	55	55	60	63	65
T	960	960	960	960	960	960	960	960	960	960	960	960	960
H-133 GROUND COMMUNICATION UNIT													
OASLA*	62	62	63	64	61	59	60	63	63	63	66	70	71
T	960	960	960	960	960	960	960	960	960	960	960	960	960
COMMUNICATION													
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)													
PSIL	85	86	86	86	85	81	83	87	86	86	89	93	93
ANNOYANCE													
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)													
TONE CORRECTION (C IN DB)													
PNLT	104	106	107	110	107	102	102	108	107	107	112	115	117
C	1	1	2	3	3	3	1	2	2	2	2	2	3

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

TABLE: 3 MEASURES OF HUMAN NOISE EXPOSURE

IDENTIFICATION:
OMEGA 3.2
TEST 8A-000-004
RUN 02
06 APR 82
PAGE H2

NOISE SOURCE/SUBJECT: MA-3M AIR CONDITIONER, GROUND CREW, NEAR FIELD NOISE LEVELS
OPERATION: COOLING CYCLE

	LOCATION/CONDITION												
DISTANCE (M)-->	4	4	4	4	4	2	2	2	2	2	2	2	2
ANGLE (DEG)-->	260	280	300	320	340	0	20	40	60	80	100	120	140
CONDITION---->	A	A	A	A	A	A	A	A	A	A	A	A	A
HAZARD/PROTECTION													
C-WEIGHTED OVERALL SOUND LEVEL (OASLC IN DBC) AT EAR													
A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DBA) AT EAR													
MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)													
NO PROTECTION													
OASLC	110	107	107	108	112	104	102	100	106	102	102	104	105
OASLA	104	102	102	103	107	100	99	96	101	97	97	99	99
T	15	21	21	18	9	30	36	60	25	50	50	36	36
MINIMUM QPL EAR MUFFS													
OASLA*	86	84	84	85	88	80	78	75	83	78	78	81	82
T	339	480	480	484	240	960	960	960	571	960	960	807	679
AMERICAN OPTICAL 1700 EAR MUFFS													
OASLA*	81	79	79	80	83	75	74	71	78	74	74	76	77
T	807	960	960	960	571	960	960	960	960	960	960	960	960
V-51R EAR PLUGS													
OASLA*	83	81	81	82	86	77	75	73	79	75	75	78	78
T	571	807	807	679	339	960	960	960	960	960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS PLUS V-51R EAR PLUGS													
OASLA*	65	63	63	64	68	62	62	58	62	59	59	61	61
T	960	960	960	960	960	960	960	960	960	960	960	960	960
H-133 GROUND COMMUNICATION UNIT													
OASLA*	72	69	69	70	75	71	71	68	70	68	68	69	70
T	960	960	960	960	960	960	960	960	960	960	960	960	960
COMMUNICATION													
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)													
PSIL	95	92	92	92	97	94	92	91	93	91	91	92	93
ANNOYANCE													
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)													
TONE CORRECTION (C IN DB)													
PNLT	117	115	115	116	120	113	111	108	115	110	111	113	114
C	3	2	2	3	3	1	1	0	2	1	1	2	1

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

TABLE: MEASURES OF HUMAN NOISE EXPOSURE

3

IDENTIFICATION:
OMEGA 3.2
TEST 8A-000-004
RUN 03
06 APR 82
PAGE H3

NOISE SOURCE/SUBJECT:
MA-3M AIR CONDITIONER
GROUND CREW
NEAR FIELD NOISE LEVELS

OPERATION:
COOLING CYCLE

	LOCATION/CONDITION										
DISTANCE (M)-->	2	2	2	2	2	2	2	2	2	2	OPERATOR LOCATION
ANGLE (DEG)-->	160	180	200	220	240	260	280	300	320	340	TEST CONDITION
CONDITION---->	A	A	A	A	A	A	A	A	A	A	1/A
HAZARD/PROTECTION											
C-WEIGHTED OVERALL SOUND LEVEL (OASLC IN DBC) AT EAR											
A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DBA) AT EAR											
MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)											
NO PROTECTION											
OASLC	105	109	106	109	116	117	118	119	112	107	112
OASLA	102	105	101	105	111	112	113	113	108	102	107
T	21	13	25	13	4.5	3.8	3.2	3.2	8	21	9
MINIMUM QPL EAR MUFFS											
OASLA*	83	86	83	86	93	94	95	95	89	83	89
T	571	339	571	339	101	85	71	71	202	571	202
AMERICAN OPTICAL 1700 EAR MUFFS											
OASLA*	78	81	78	81	88	89	90	90	84	78	84
T	960	807	960	807	240	202	170	170	480	960	480
V-51R EAR PLUGS											
OASLA*	79	83	79	83	90	91	92	93	87	81	86
T	960	571	960	571	170	143	120	101	285	807	339
AMERICAN OPTICAL 1700 EAR MUFFS PLUS V-51R EAR PLUGS											
OASLA*	64	66	63	67	72	74	75	75	70	63	69
T	960	960	960	960	960	960	960	960	960	960	960
H-133 GROUND COMMUNICATION UNIT											
OASLA*	74	74	72	74	79	80	80	80	77	71	76
T	960	960	960	960	960	960	960	960	960	960	960
COMMUNICATION											
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)											
PSIL	97	98	95	97	101	103	103	103	100	94	99
ANNOYANCE											
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)											
TONE CORRECTION (C IN DB)											
PNLT	115	118	115	118	124	125	126	126	121	116	120
C	1	1	1	2	2	2	3	2	3	2	2

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

U.S. Government Printing Office: 1982 - 559-007/6053

END

DATE
FILMED

7 82

DTIC